

Structural Variations
in Verbally Reported Objectives

Bernhard Bierschenk
Inger Bierschenk



Lund University
Sweden

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Inger Bierschenk

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Cognitive Science Research
Lund University
S-223 50 Lund
Sweden

Coordinator: Bernhard Bierschenk
Department of Psychology

Abstract

The study reported shows the implications of incorporating the autonomous observer into the experimental range. Subjects have verbally described pictorially mediated information, and their determination of the action centre of the observations has been made the basis for clustering ecologically significant objectives. It is demonstrated that objectives, conceptually divided into the subcomponents Figures and Grounds, are structured differently both in relation to each other and in relation to the sources of observation. By using linguistic cues to the binding between perspective and objective structure, the authors have been able to come to a meaningful interpretation without assumptions of causality.

Enhancement of Reality

When confronted with the problem of making specific and precise statements in natural language, scientists of design report on their uneasiness before such a task. This may be due to the circumstance that they traditionally regard language as an object of observation, which is to be subjected to the physical laws for its description and therefore has to be founded on logical form (Simon, 1981). This general position implies that it is only possible to discuss meaning as the sum of features of the object of language, and, as a consequence, that this is done in terms of universals in the sense of a geometrical formalism. Its basic representational formula is the logical proposition, which is constructed for the computation of object positions in a space.

Traditional studies in human information processing, as for example in perception psychology and memory research, start from this physical view on language. Thus single linguistic elements serve as the basis of statements about human symbolic processing. The experimental design, itself, binds the "predicate" to attributing objective facts to different subjects. It is further this conscious split between the predicate and its subject that is the traditional starting-point of linguistic analysis (I. Bierschenk, 1984b). Any influence on the analysis of what is predicated is not ascribed to the subject. The decisive point that we wish to enhance is that this point of view rests on a confusion of the analyzing subject and the representation of the subject in a linguistic observation.

Determination of a Reference Point

This study starts from the assumption that people are able to perceive objects and events in an environment and to present them in symbolic form. Whenever observational events structure the language of an observer, this language contains "exterospecific" information belonging to these events (concerning this term, see Gibson, 1979). This means that the language has a supporting function in relation to the information it carries. With this point of

departure it is not the attributes of the language that stand out for observation but, instead, what is being mediated through the language. Thus the point of reference has to be defined by the observer, i.e. the source of the predication.

We have introduced the autonomous observer into the language formalism (B. Bierschenk, 1984a,b; I. Bierschenk, 1984a). The idea here is that people's ability to extract ecological information out of a "sequence" must be understood in terms of the Agent - action - Objective paradigm. The implications of the use of this paradigm in the analysis of people's predications about something exterospecific is illustrated with the following two examples. An observer views an infant on a table top and may mark the point of reference like this:

The infant crawls across the table top (1)

Agent

I observe that the infant crawls ... (2)

Agent Objective [Agent]

The reference point in example (1) marks the agent as the action centre, the point from where the action starts. It is the intentional and thus most basic component without which an action can neither occur nor be observed. The second example (2) marks this action centre as being the perceptual source. Perception is here conceived as an active process (with or without motor activity). The predication of this process, in fact, objectifies the action centre by putting the observer into the object of observation (scene). This paradigmatic relationship may be formally expressed:

$$A \rightarrow a \rightarrow O \quad \text{and} \quad A \rightarrow a \rightarrow [A \rightarrow a \rightarrow O] \quad (3)$$

By binding the observer to the objective (2) and by integrating the objective into the observer (1) in recurrent and observable asymmetrical relations, structural stability can be studied.

Ecological Objectives

After the specification of the reference point for the observation of objectives, the objectives as expressed in language can get their clear boundaries. As objectives in this study are defined those two subcomponents of the predication referred to as figures and grounds, in the linguistic sense (I. Bierschenk, 1984b). They are determining each other such that the figures pre-require the grounds for their formation but not the reverse. Thus grounds may be integrated or not. Non-integrated grounds are pointed at by prepositions. Examples (4) and (5) illustrate these two kinds of objective categories:

- | | |
|---|-----|
| The infant regards its mother at the other side | (4) |
| Figure Ground | |
| The infant crawls across the deep side | (5) |
| Ground | |

This subdivision of the Objective component has been made to pick up the circumstance that there is always some background with which a viewpoint (a formed figure) should be seen whether this ground be linguistically supporting the perception or not. Thus, in observation, the paradigm is full when either of the two is overtly present.

In communication, objectives, quite evidently, are mediated with a perspective. It has been determined that ecological objectives, i.e. integrated grounds, have a steering function on the structuring of the perspective (Bierschenk & Bierschenk, 1984). A matter of concern here is the extent to which the presence of a certain perspective structure differentiates the objectives.

Experiment

Method

The experiment concerns a pictorial presentation of the Visual Cliff experiments (Gibson & Walk, 1960). The authors describe the picture series as follows:

Child's depth perception is tested on the visual cliff. The apparatus consists of a board laid across a sheet of heavy glass, with a patterned material beneath the glass on one side and several feet below it on the other. Placed on the centre board (top left), the child crawls to its mother across the "shallow" side (top right). Called from the "deep" side, he pats the glass (bottom left), but despite this tactual evidence that the "cliff" is in fact a solid surface he refuses to cross over to the mother (bottom right). (p 65)

The experimental hypothesis is that natural language mediates differentiations and structural variation of ecological kind in the observation of objectives and that their structure is determined by the perspective structure as mediated by the agents of linguistic observations.

Subjects. Sixteen parents were asked to describe the pictures at the time when they were booked for a regular control of their eight to nine months old children at a rural district's child care centre.

Material. The subjects were given orally the task to describe the picture series seen as a conceptual whole. It was a written task. The kind of text produced may be illustrated with the following one:

The child wants to crawl to its mother. When she moves to another place the child tries to crawl there (to the mother). When he/she meets a "barrier" in getting to the mother he/she becomes insecure, hesitant but still wants to try to approach the familiar face = the mother.

Results

By the introduction of the experimental subjects as autonomous observers any ordering of the ecological objectives will be perspectively based. The perspective is in the textual flow, which means that we need a computational method that divides the measuring objects into categories. The method used is the cluster anal-

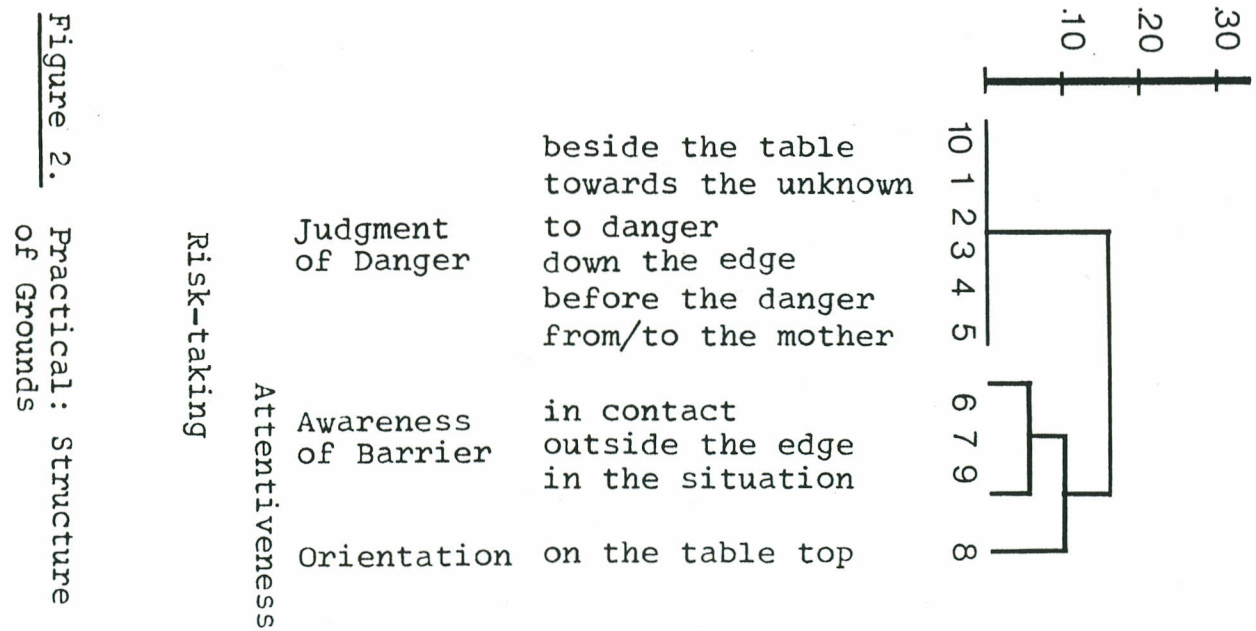
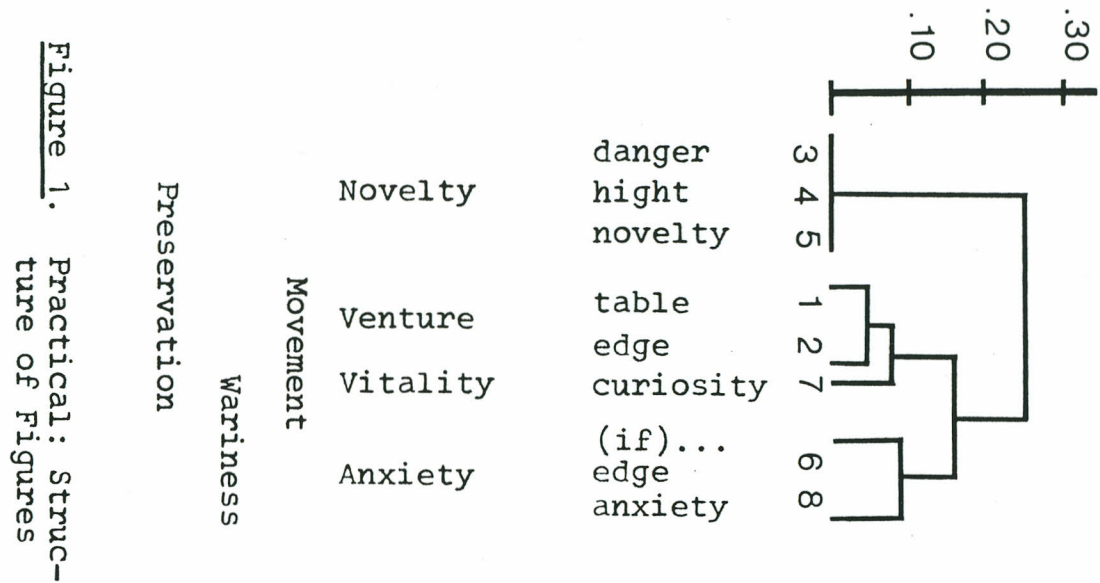
ysis.

It has been hypothesized and demonstrated (Bierschenk & Bierschenk, 1984) that there are motivational factors governing the observers' attention to an environment. Instead of having to assign the results of the analyses to types of subjects we could use their expressed interests to reduce the matrices. The analysis will be presented on the basis of four specific matrices of the Nxp type characterizing the subjects by (1) Practical, (2) Aesthetic-Moral, (3) Social, and (4) Technical-Physical interests.

The process of concentrating the objectives into a matrix starts with an arrangement where the agents make up the columns and the objectives the rows. The relational affinity between the objectives of the observations is computed on the basis of the dependencies expressed through the agents' coincidences with different kinds of objectives. It is the action component of the model (3) that allows us the detection of a conceptual development of a theme. The procedure chosen (Ward, 1963) has been executed with Wishart's (1982) CLUSTAN program. Through an iterative application the cluster algorithm searches for the grouping that can represent the total configuration. At the empirical definition of a cluster, two premises have been decisive: (1) There is an obvious break in the classification, or (2) the criterion value of .10 can be applied such that the resulting collinear clusters can be given a meaningful interpretation.

Since this analysis concerns the structuring and interdependency between the two kinds of objects, (4), (5), they were conceptually differentiated and kept separate in the analysis procedure.

Practical. The process of concentrating the objects of the subjects with an interest in practical matters starts from an empirical grouping of the figures present in their texts. What they figure is thus that which stands out, i.e. is in focus of an expressed perception or action. This figuration can be viewed in the light of the grounds binding the figures. The results are dis-



played in Figures 1 and 2 respectively.

On the basis of an amalgamation of the figures perceived as the most closest to each other (or most similar) four clusters emerge. Their prototypical character has been summarized in the descriptions Novelty, Venture, Vitality, and Anxiety. But more important is that the structured configuration can be observed by the operating structural connections presented. The graphed relationship (Jardine & Sibson, 1971) expresses in its entirety a Preservation made up of two subcomponents, Wariness and Movement.

The grounds onto which this prototypical figure is reflected can be summarized into Judgment of Danger, Awareness of Barrier, and Orientation. The last two are subcomponents of an Attentiveness. On the whole, the grounds of the practically concerned can be summarized as Risk-taking.

Aesthetic-Moral. The division of objectives points at three clusters of figures and three of grounds, as can be read out from Figures 3 and 4. The first cluster concerns the Exposure of the child, whereas the second by a well-known form denotes a barrier, i.e. an Environmental Cue. The third cluster amalgamates aspects of Attraction. The structural relations expressed indicate a concern about the Risk-taking with one subcomponent, Motivation.

The structuring of the grounds indicates that this group is guided by the Tactile Orientation, the Avoidance of Danger, and Directionality. The latter two make up the behaviour specified as Detour. This behaviour together with Tactile Orientation expresses this group's Perceptual-Motor Orientation.

Social. The structural relation of the figures of this group deviates in important respects from the first two in that it shows a concern with the child's relation to the specific features of the surface. The structured relations of the grounds, moreover, indicate that this concern is supported by caution (Fig. 5 and 6).

As is evident from Figure 5, a Cessation and what Significance this may have for the child's behaviour is reflected by an inter-

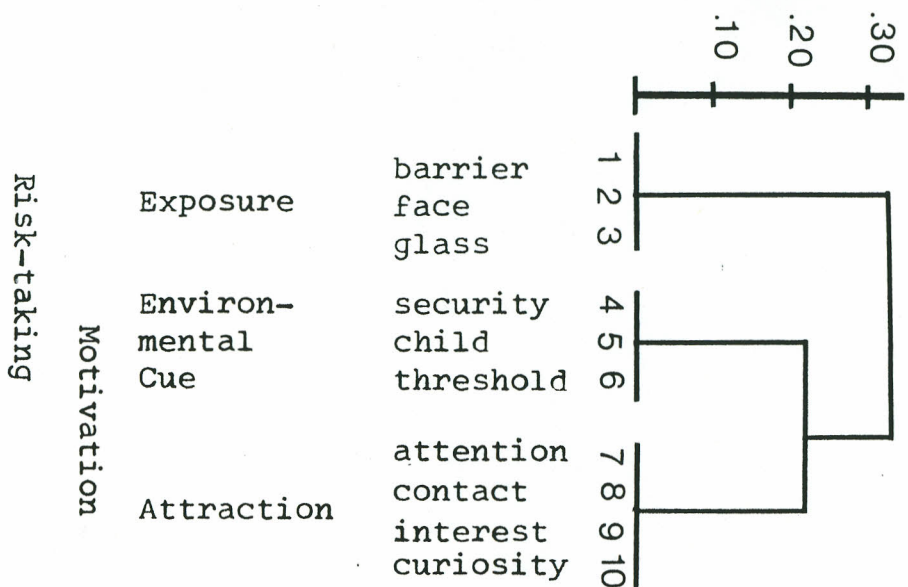


Figure 3. Aesthetic-Moral: Structure of Figures

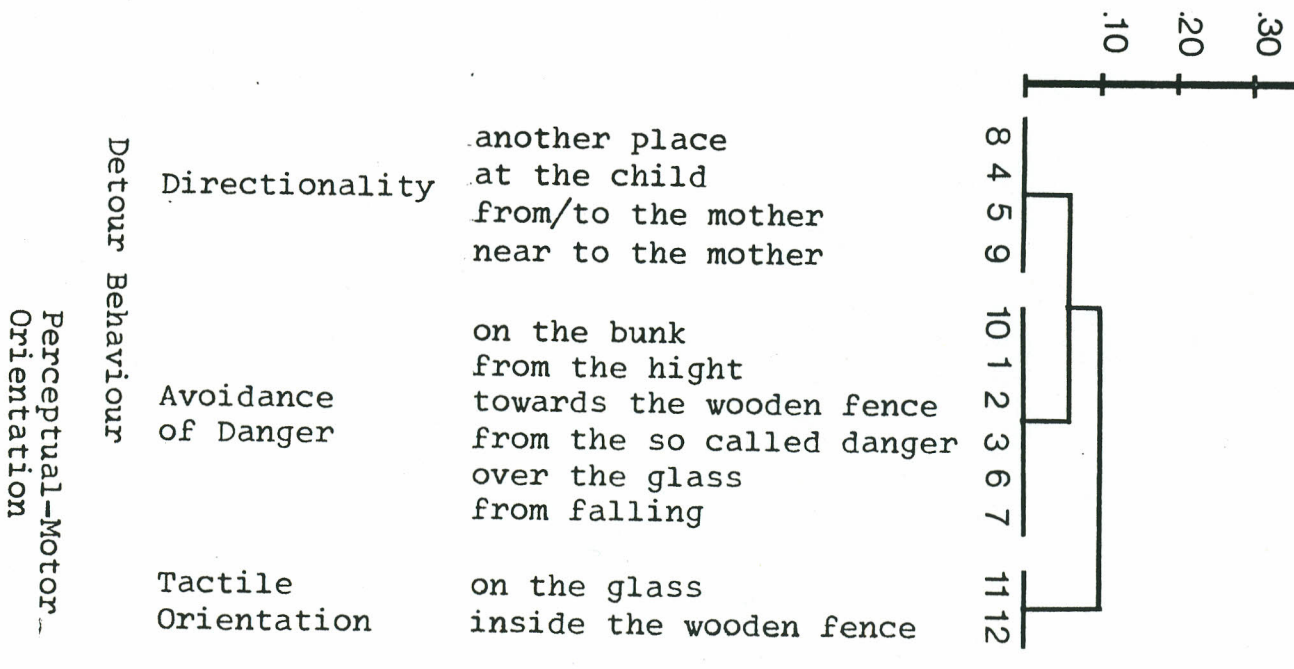
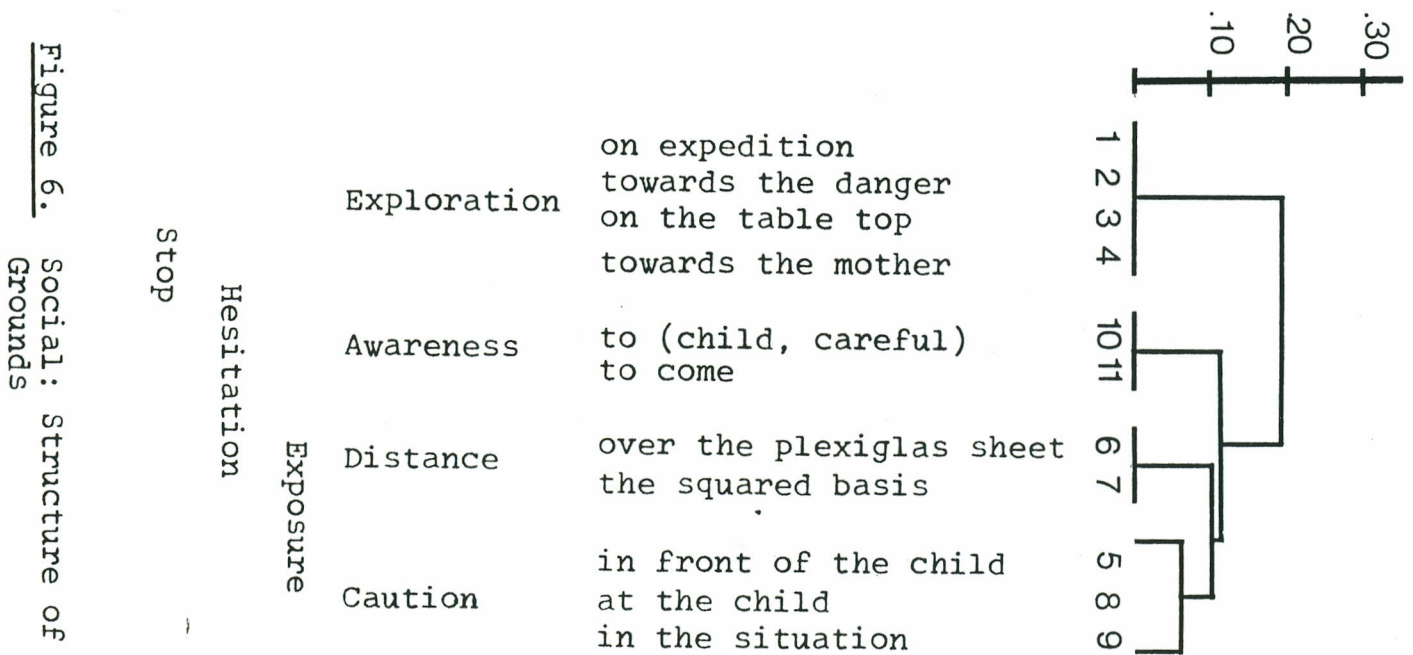
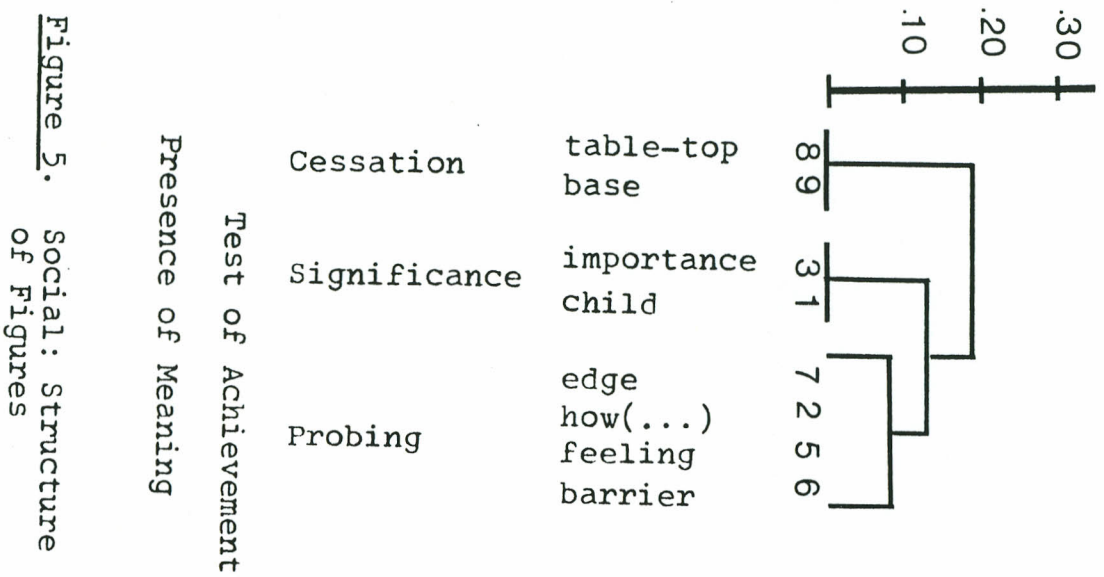


Figure 4. Aesthetic-Moral: Structure of Grounds



est in Probing the child's ability to orient in its environment. The graphed structure shows that the Presence of Meaning, having one subcomponent, Test of Achievement, gives expression to an awareness of what stands out for the child.

The four clusters of grounds emerged can be described in terms of Caution and Distance, which are summarized into Exposure. The awareness of exposure given by this environment leads to Hesitation, which together with Exploration forms a Stop.

Technical-Physical. The division of the figures shown in Figure 7 points at four clusters. The first one is built up of a specific combination belonging to the experimental set up. It gives expression to the child's starting position, Placement. The second denotes the Environmental Cues, and the third relates possible sources of influence, thus Attention. The fourth cluster simply concerns "the subject". The category names point at an instrumental figuration. The graphically presented structure shows that the concern of the technically-physically interested group by way of Awareness and Pertinence is the Perception of an Edge.

The Orientation and Direction clusters of the grounds (Fig. 8) give expression to Risk-taking. This together with Call leads to an Enforcement of Decision. That which is viewed in the Visual Field governs the Perceptual Judgment, and with the Power of Influence that this environment has, its Affordance is perceived. The Detour behaviour expresses that the affordance supports the Emergence of Meaning. Together with Reconnoitering Behaviour this meaning leads to Adaptive Behaviour.

Discussion

A common conception of behaviour geneticists is that fear is genetically rooted (Royce & Mos, 1979) and that it manifests itself in various behaviours leading to avoidance. Therefore, a study of the correspondence between genetically endowed structure and experience could lead to information about the evolution of behaviour. Since the members of different species show their intention of survival with negatively valued emotional reactions

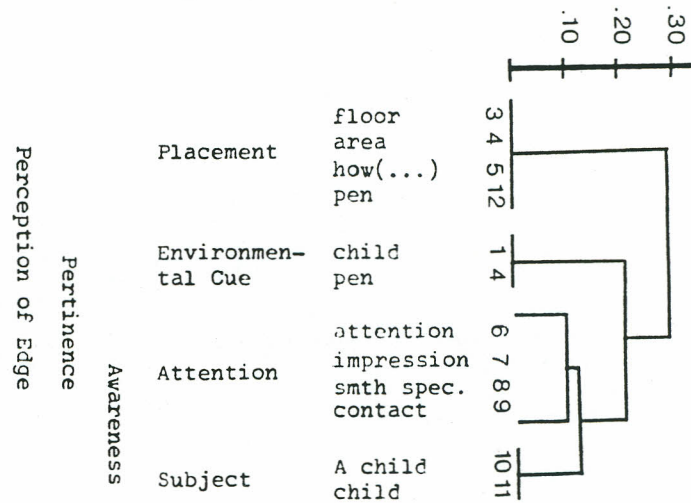


Figure 7. Technical-Physical: Structure of Figures

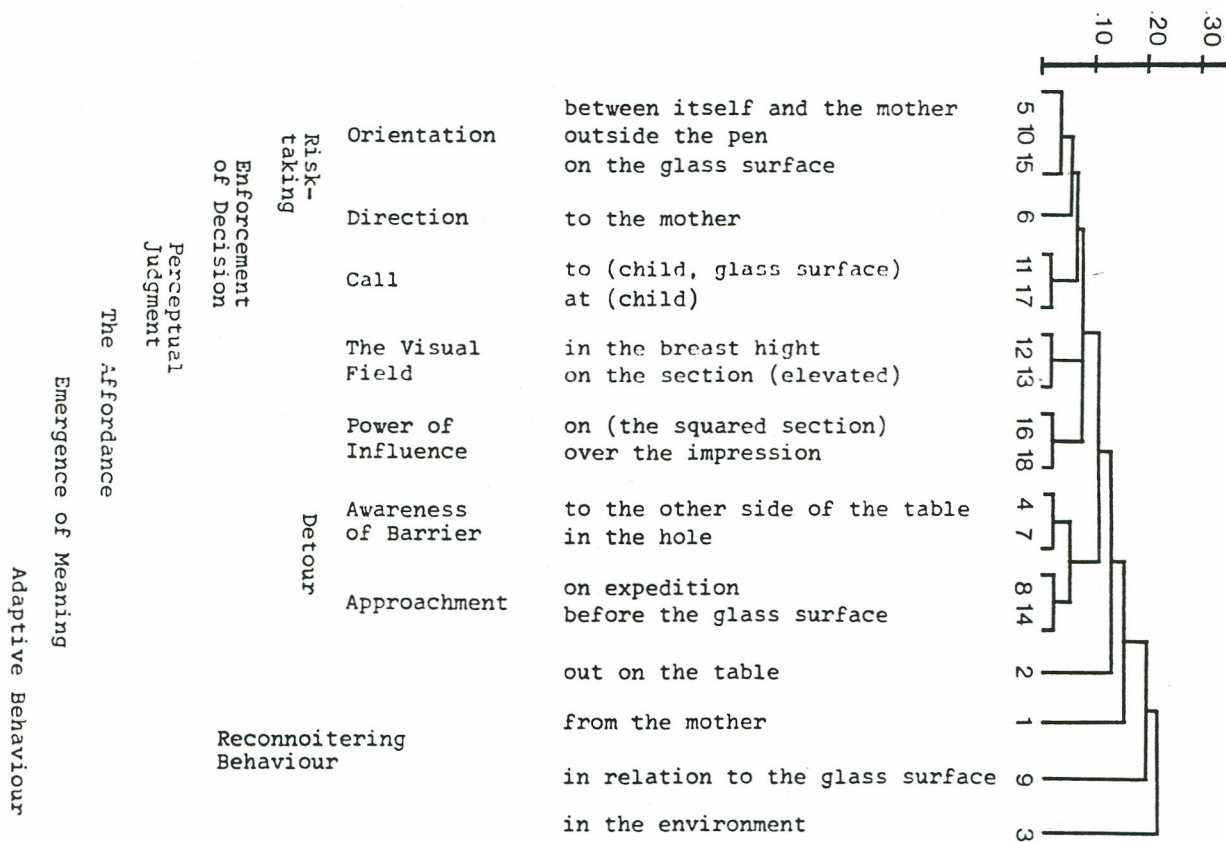


Figure 8. Technical-Physical: Structure of Grounds

towards heights, the study of this phenomenon in very young infants of humans and animals has attracted scientists of various fields. Their interest has been to investigate the sensitivity to height as a natural cue of danger. No doubt, this conception had a governing influence on the design of the ecological component in the Visual Cliff.

The structural relations shown to exist in the subjects' verbal flow demonstrate the direct pick up of the pictorially mediated representation of the avoidance paradigm. Moreover, the categories discerned are not only different but also differently related to each other. With the interests as basis for the objective structuring, the dependency of the structure of the figures on existing grounds, as expressed in the material, seems meaningful.

That which presents itself to the practically concerned subjects is preservation, a point of view that may be enhanced by their orientation towards risk-taking (Preservation $\leftarrow$ Risk-taking). The aesthetic-morally endowed are more sensitive in their orientation, so risk-taking is in focus of their perception, guided by both perception and motor activity (Risk-taking $\leftarrow$ Perceptual-Motor Orientation). For the socially oriented, the environment elicits stop reactions, reflecting the presence of meaning, which may be intuitive (Meaning $\leftarrow$ Stop). Finally, the edge is perceived by the subjects with technical-physical interests. Basic to their perception is an adaptive behaviour, which according to its nature does not necessarily mean that the consequences of the perceived has been integrated (Edge $\leftarrow$ Adaptive Behaviour).

The division of the subjects into interest groups facilitates the interpretation. But with the incorporation of the autonomous observer into the experimental range there is no need for assumptions of causality.

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